

Listing of the Claims

This listing of claims will replace all previous versions and listings of claims in this application:

1. **(Cancelled)**

2. **(Cancelled)**

3. **(Previously Presented)** The method according to claim 20, further comprising:
periodically waking up the hibernating device to listen for beacons of other devices; and
returning the hibernating device to the hibernation mode if other devices have indicated no pending traffic for the hibernating device in their beacons.

4. **(Previously Presented)** The method of claim 20, further comprising:
keeping information on the presence of a beacon of the hibernating device in beacons of other devices during the announced sleep period duration of the hibernating device.

5. **(Previously Presented)** The method of claim 20, further comprising:
including the address of a device transmitting the beacon Hibernation Information Element in a beacon transmitted by another device in one of an information element and field when the other device has pending data for delivery to the transmitting device; and
maintaining the transmitting device in an active mode if a beacon with one of an information element and field including pending data for the transmitting device is received before the transmitting device hibernates.

6. **(Cancelled)**

7. **(Cancelled)**

8. **(Previously Presented)** The method of claim 20, wherein the sleep period start time is a number of future superframes relative to a current superframe.

9. **(Cancelled)**

10. **(Previously Presented)** The method of claim 20, further comprising:

including in the Hibernation Information Element a periodicity of the sleep period, wherein the periodicity is a sum of a number of superframes that the device will be in the hibernation mode and a number of superframes the device will be in an active mode, wherein the active mode is defined as the device not being in the hibernation mode.

11. **(Previously Presented)** The method of claim 20, further comprising:

announcing, when a device in an active mode has pending data to transmit to at least one intended receiver device, the pending data by including a Traffic Indication Map Information Element in a beacon of the device, wherein the Traffic Indication Map Information Element comprises at least the device addresses of the at least one intended receiver device of the pending data.

12. **(Previously Presented)** The method of claim 20, further comprising:

entering a device into a sleep state during a superframe when the device is in an active mode and when there are no pending data transmissions for the device that are announced in the beacons of other devices; and

waking up the device from the sleep state at the beginning of each beacon period.

13. **(Previously Presented)** The method of claim 20, further comprising:

entering a device into a sleep state during a superframe when the device is in an active mode and when the device has sent and received all data pending in the current superframe; and

waking up the device from the sleep state at the beginning of each beacon period.

14. **(Previously Presented)** The method of claim 20, further comprising:

entering a device into a sleep state during a superframe when the device is in an active mode and when the device is not involved in any of the transmissions that are announced in the beacons of other devices; and

waking the device up from a sleep-mode at the beginning of its own beacon period, and at the beginning of beacon periods in which it does not transmit its own beacon when the device has at least one active data stream.

15. **(Previously Presented)** A communications network including a plurality of devices that save power by announcing hibernation in their beacon frames by performing the power-saving method of claim 20.

16. **(Previously Presented)** A wireless device that saves power by entering at least one of a hibernation or sleep mode, comprising:

an antenna for sending and receiving messages over a wireless medium;

a receiver coupled to the antenna to receive a message transmitted over the wireless medium;

a transmitter coupled to the antenna to transmit messages over the wireless medium;

a beacon processing module to perform beacon processing for the device;

a processor to divide time into a sequence of at least one superframe having at least one beacon period and operatively coupled to:

the transmitter and the receiver to send and receive data and respectively send and receive beacon frames announcing the intention of the device to hibernate and beacon frames indicating that other devices have pending data for the device,

the beacon processing module to:

process Hibernation Information Elements of received beacon frames of other devices and maintain therefrom a hibernation table of characteristics of the other devices;

keep the device in an active mode if a received beacon announces pending data for the device;

announce the intention of the device to enter a hibernation mode at a start time and for a sleep period; and

periodically wake up the device when the device is hibernating to listen for beacons of other devices and to put the device back into a hibernation mode if other devices have indicated no pending traffic for the hibernating device in their beacons.

17. (Previously Presented) The device of claim 16, wherein the processor is further configured to:

when the device is in an active mode, place the device into a sleep state during a superframe when there are no pending data transmissions for the device announced in the received beacons of other devices; and

wake up the device from the sleep state at the beginning of each beacon period.

18. (Previously Presented) The device of claim 16, wherein the processor is further configured to:

when the device is in an active mode, place the device into a sleep state during a superframe when the device has sent and received all data pending in the current superframe; and

wake up the device from the sleep state at the beginning of each beacon period.

19. (Previously Presented) The device of claim 18, wherein the processor is further configured to:

when the device is in an active mode, place the device into a sleep state during a superframe when the device is not involved in any of the transmissions that are announced in the beacons of other devices; and

when the device has at least one active data stream, wake up the device from the sleep state at the beginning of: its own beacon period of the device; and beacon periods in which the device does not transmit its own beacon.

20. **(Previously Presented)** A method for saving power in a wireless communication network including a plurality of devices, comprising:

- dividing time into a sequence of at least one superframe having at least one beacon period;

- grouping beacons of different devices into at the least one beacon period;

- defining a sleep period as a plurality of superframes;

- transmitting a beacon Hibernation Information Element announcing a sleep period start time and a sleep period duration; and

- hibernating in a hibernation mode during the announced sleep period duration, wherein a hibernating device does not transmit a beacon during the sleep period.